1.1 Radio Astronomy

1.1.1 Maintenance and Calibration

- DSS65 S-band comb generator was replaced. Clock Synchronization Principal Investigator (PI) confirmed that phase instability problem has been already solved.
- FS-9.9.0 software problem detected during a recent European VLBI Network observation, has been confirmed to be related with the station dependent script "minical_src". Problem to be solved.
- Beam waveguide antennas realtime performance scripts were further optimized. An audible alarm alerts of any possible antenna problem. These scripts were used during recent Reference Frame Calibration supports and proved to be very useful to minimize data lost due to antenna problems.
- DSS-54 calibration run to measure X-band efficiency using Antenna Calibration and Measuring Equipment –ACME- (DSS54, DSN ANTCAL, 500min).

1.1.2 RA meetings and training courses

Cristina Garcia-Miro (CGM) was visiting JPL and Goldstone during first weeks of January. At JPL several meetings were held with different members of the DSN ATOT Office and CGM gave a report on the status of MDSCC Radio Astronomy at the ATOT Wednesday meeting. At Goldstone, CGM received a training course on the Q-band receiver that is currently installed at DSS-13. CGM also visited ITT Monrovia facility and had a meeting with the Radio Astronomy staff; she also visited the Block II Correlator facility and learned about the new Mark5 software correlator.

A realtime training course on Spectroscopy Observations was imparted to Dr. Aina Palau, postdoc at LAEFF (INTA).

1.1.3 Observations

1.1.3.1 Host Country Spectroscopy

During this month spectroscopy observations with DSS-63 antenna were carried out using the SPB500 spectrometer and the MarkIV data acquisition terminal.
Additionally the Wide VLBI Science Receiver (WVSR) was configured and data was simultaneously recorded to check scientific validity of the WVSR spectra and perform its calibration.

Host Country projects carried out with DSS-63 antenna during this period were the following:

- **D63-S01:** study of CCS molecule (22.334 GHz) extended emission in young low-mass protostars. Frequency switching mode was used.

- **D63-S05:** study of ammonia (NH3) emission toward massive young stellar objects. The sample consists of regions in different evolutionary stages, and NH3

will be used to determine the physical properties of the dense gas at each evolutionary stage. Position switching mode was used.

DOY	minutes scheduled	minutes used	percent good data	Activity	comments
021	320	120	100	"ATOT Development D63"	WVSR tests antenna scripts tests, WVSR tests and antenna calibration
023	540	400	100	"GBRA Engineering D55"	
026	330	300	100	"GBRA Host Country D63-S01"	good pointing
029	145	100	80	"GBRA Host Country D63-S05"	remote obs
030	145	45	95	"GBRA Host Country D63-S05"	antenna problems

1.1.3.2 Interferometry

MDSCC participated in 5 Very Long Baseline Interferometric (VLBI) observations (2910 min in total):

- RFC Clock Synchronization on DSS-65 (3 observations; 720 min): for first observation, one source was lost (2% data lost) due to antenna problems (DR#M104590). It was noticed by the PI large instabilities at S-band phase calibration tones. For second observation, 100% data collected, performance of system nominal. The PI reported that S-band phase calibration tones problem was already solved. For the third observation, five sources were lost (5% data lost) due to antenna problems (DR to be open).

- RFC Cat X/Ka on DSS-55 (1 observation; 1080 min): 32 sources lost due to a Field System s/w configuration problem (11% data lost, DR#M104632). Additionally 5 sources were partially lost and 4 sources completely lost due to antenna problems (2% data lost, DR#M104637).

- EUROPE Space Geodesy Program on DSS-65 (1 observation; 1110 min): 12% data lost and 8% data degraded due to antenna problems (DR#M104624).